MONTHLY WEATHER REVIEW.

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INTRODUCTION.

The general weather conditions which prevailed over the United States and Canada during September, 1883, are presented in this REVIEW, based upon reports received from the regular stations of the Signal Service, from the Canadian Meteorological Service, and from co-operating state weather services and voluntary observers.

The mean temperature of the month has been generally below the average in all districts east of the Rocky mountains, the greatest departures occurring from the Missouri valley eastward to the lower lake region. On the Pacific coast the mean temperature has been above the normal.

The monthly rainfall has been less than the average for September in nearly all parts of the country, the deficiencies being greatest in the east Gulf states.

Owing to the small monthly precipitation over most of the country, drought prevailed to a great extent; and in many localities forest fires burned over large tracts of land, causing the destruction of much property, especially in the New England states.

On chart v. are shown the limits within which frosts occurred during the month.

The storm traced as number iv. on chart i., was a tropical hurricane which moved slowly northwestward over the West Indies, to the North Carolina coast, between the 5th and 10th. This storm, which was very disastrous to shipping, is fully described under "areas of low barometer."

The small number of reports from vessels encountering icebergs during September indicates that the north Atlantic ocean is comparatively free of ice. Chart ii., therefore, which heretofore has shown the limits of ocean ice, shows only the approximate paths of the storms occurring in the north Atlantic.

In the preparation of this REVIEW the following data, received up to October 20th, have been used, viz.: the regular tri-daily weather-charts, containing data of simultaneous observations taken at one hundred and twenty-two Signal Service stations and fifteen Canadian stations, as telegraphed to this office; one hundred and forty-six monthly journals, and one hundred and thirty-five monthly means from the former, and fifteen monthly means from the latter; two hundred and forty-seven monthly registers from voluntary observers; fifty-two monthly registers from United States Army post surgeons; marine records; international simultaneous observations; marine reports, through the co-operation of the "New York Herald Weather Service;" abstracts of ships' logs, furnished by the publishers of "The New York Maritime Register;" monthly weather reports from the local weather services of Indiana, Kansas, Nebraska, Ohio, and Tennessee, and of the Central Pacific railway company; trustworthy newspaper extracts; and special reports.

ATMOSPHERIC PRESSURE.

[*Expressed in inches and hundredths.*]

The distribution of mean atmospheric pressure for the month of September, 1883, determined from the tri-daily telegraphic observations of the Signal Service, is shown by the isobarometric lines on chart iii. A small area of barometric maxima, inclosed by the isobar of 30.1, occupies a part of northern Montana. Two isobars of 30.05 are shown on the chart. The more northerly of these extends in an easterly direction from northeastern Minnesota to Nova Scotia; and the other is traced from the northern boundary of Washington territory southeastward to near the western Gulf coast, thence northeasterly in an irregular line to the lake region, thence southward to northern Georgia, and thence northeastward to the north Carolina coast. The highest barometric means reported are 30.15, from Fort Shaw, Montana, and 30.1 from Fort Buford, Dakota. Within the area between the isobars of 30.05 the mean pressures vary from 30.05 to 30.09. The mean atmospheric pressure has been least in California and southern Arizona; the lowest barometric mean, 29.78, is reported from Yuma, Arizona.

Compared with the mean pressure for August, 1883, there has been a decrease on the Pacific coast varying from .01 to .08; there has also been a very slight decrease in Florida. Along the Gulf and south Atlantic coasts and in the Ohio valley and Tennessee no change has taken place. Elsewhere over the country the mean pressure is greater than that of August, the excess being greatest over the northern and middle slopes, extreme northwest, and in New England and the Canadian maritime provinces. The greatest increase occurred at Cheyenne, Wyoming, where it amounted to .15.

DEPARTURES FROM THE NORMAL VALUES FOR THE MONTH.

The mean atmospheric pressure of September, 1883, compared with the September normal shows a slight deficiency on the Pacific coast (except at Red Bluff, California, where it is .03 above), in Maine, and east of the Mississippi river south of the Ohio valley. The greatest departures below the normal are .05 at Portland, Oregon, and .06 at Louisville, Kentucky. In all other districts the mean pressure is above the normal for September, the departures being greatest from the upper lake region southwestward to Colorado and Wyoming, where they vary from .08 to .10.

BAROMETRIC RANGES.

The monthly barometric ranges have been greatest in New England, the lake region, and on the North Carolina coast in the vicinity of Smithville. The largest monthly range (1.25) is reported from Eastport, Maine. The smallest monthly ranges are reported from California and from stations along the Gulf coast, the minimum, 0.19, occurring at Los Angeles, California.

In the several districts the monthly barometric ranges have varied as follows:

New England.—From 0.98 at Block Island, Rhode Island, to 1.25 at Eastport, Maine.

Middle Atlantic states.—From 0.60 at Norfolk, Virginia, to 1.16 at Albany, New York.

South Atlantic states.—From 0.40 at Atlanta, Georgia, to 0.86 and 1.08 at Wilmington and Smithville, North Carolina, respectively.

Florida peninsula.—From 0.33 at Key West to 0.41 at Sanford.

Eastern Gulf.—From 0.32 at Vicksburg, Mississippi, to 0.43 at Montgomery, Alabama.

Western Gulf.—From 0.32 at Little Rock, Arkansas, to 0.40 at Fort Smith, Arkansas.

Tennessee.—From 0.37 at Memphis, to 0.45 at Knoxville.

Ohio valley.—From 0.59 at Louisville, Kentucky, to 0.73 at Columbus, Ohio.

Lower lakes.—From 0.83 at Sandusky, Ohio, to 1.19 at Oswego, New York.

Upper lakes.—From 0.77 at Duluth, Minnesota, to 1.08 at Alpena and Mackinaw City, Michigan.

Extreme northwest.—From 0.87 at Saint Vincent, Minnesota, to 0.93 at Fort Buford, Dakota.

Northern slope.—From 0.58 at North Platte, Nebraska, to 0.92 at Fort Benton, Montana.

Middle slope.—From 0.48 on the summit of Pike's Peak, Colorado, to 0.77 at West Las Animas, Colorado.

Southern slope.—0.50 at Fort Stockton, Texas.

Southern plateau.—From 0.35 at Fort Grant, Arizona, to 0.58 at El Paso, Texas.

Northern plateau.—From 0.60 at Dayton, Washington Territory, to 0.62 at Spokane Falls, Washington Territory.

North Pacific coast.—From 0.55 at Roseburg, Oregon, to 0.62 at Fort Canby, Washington Territory, and Portland, Oregon.

Middle Pacific coast.—From 0.33 at Sacramento, San Francisco and Red Bluff, California, to 0.47 at Cape Mendocino, California.

South Pacific coast.—From 0.29 at Los Angeles, California, to 0.38 at Yuma, Arizona.

AREAS OF HIGH BAROMETER.

Seven areas of high barometer appeared within the limits of or near the northern boundary of the United States during the month. They were generally first observed in the northwestern territory north of Montana. Those appearing in this region moved in a southeasterly direction until the centre of greatest pressure passed east of the Mississippi valley, after which the general course was easterly or slightly to the south of east. Two areas of high pressure approached the north Pacific coast from the west, one of which disappeared on that coast. The second of these areas was attended by the maximum pressure observed during the month at stations in the extreme northwest. It crossed to the east of the Rocky mountains near the northern boundary and disappeared north of Dakota.

I.—This area was observed in the extreme northwest on the morning of the 2d, the barometer being above 30.4 near the centre. The temperature fell in the regions west of the lake region on the 3d, with increasing pressure as this area moved to the southeastward over the Missouri valley, light frosts occurring in Dakota on the 2d. After reaching the Mississippi valley the course changed to easterly, and on the morning of the 4th the barometer was high in the middle states, although this area was less clearly defined and the barometer two-tenths of an inch lower than when first observed in Dakota. It passed to the east of the Atlantic coast stations during the 4th, when the temperature rose with clear weather and southerly winds.

II.—This high area appeared in the upper Missouri valley on the morning of the 4th and followed the course of the preceding area, passing over the Missouri valley and thence eastward to the middle Atlantic states, where it was central on the morning of the 6th, when it extended over the greater portion of the country east of the Rocky mountains. The pressure had declined slightly at the centre as the area moved eastward, but the barometer was higher in the middle states than it was on the 4th when area i. extended over this section, while the latter was attended by greater pressures at the interior stations. During the 7th the easterly movement was retarded, and the temperature fell slightly in the southern states east of the Mississippi river, attended by clear weather, the wind becoming light and variable and the area could no longer be defined by isobarometric lines.

III.—This was the most northerly area of high pressure observed during the month. On the 7th it was central north of Manitoba, and it passed over the lake region on the 8th and 9th, attended by clear weather and frosts in New England and thence westward to the upper Mississippi valley. On the 10th it was central north of Lake Ontario, well-defined, and almost circular in form. During the 11th and 12th it passed directly eastward over New England to the north Atlantic with but slight variation of pressure, but with marked changes in general form as defined by the inclosing isobars. While this area was observed the pressure at the centre ranged from 30.4 to 30.5, but the barometer fell slightly after passing east of the coast.

IV.—This area appeared in Dakota on the 16th and extended over the northwest and upper lake region on the 17th, attended by cool, clear weather and frosts in Minnesota. On the 17th the barometer was highest, 30.23, in Iowa; during the 17th and 18th this area passed to the northeast over the upper lake region attended by increasing pressure at the central stations. It may be well to note that this is the only area which has been traced over a northeasterly course during the month, as it is also the only case observed within which the pressure at the centre increased as it advanced. On the morning of the 19th the pressure reached its maximum of 30.43 north of the lower lake region, while the barometer ranged from 30.3 to 30.4 in New England. This area dissipated while extended over the northeastern stations on the 20th, or passed to the northwestward and joined the high area which had appeared in British Columbia on the preceding day.

V.—The morning reports of the 19th indicated the advance of a high area from the north Pacific, the barometer at Victoria reading 30.3 with temperature at 40°. On the following morning (Thursday) killing frosts and freezing weather were reported from Montana, where the pressure exceeded 30.6. This high area remained central in the extreme northwest during the 20th and 21st, while the pressure increased rapidly at stations south of the Missouri valley, with cold northerly wind and clear weather. The temperature fell rapidly at stations west of the Missouri, and frost occurred on the 21st (Friday) in Dakota, Nebraska, Minnesota, Kansas, Indian Territory, northern Texas, and in Missouri; and on Saturday night in Arkansas, Wisconsin, Missouri, and Iowa. The high area did not pass over the districts of the United States, but it apparently moved slightly to the north after crossing to the east of the Rocky mountains, and after remaining almost stationary during the 21st and 22d, the pressure declined from 30.6 to 30.1, the temperature remaining near freezing at the northern stations west of Lake Superior. The appearance of this unusually cold wave in the northwest, attended by unusually high pressure, formed the basis of the following frost warning issued by this office on the 20th:

"*To the Manager, Western Union Telegraph Company, Madison, Wisconsin:*

A cold wave is advancing from the extreme northwest which will probably cause damaging frosts in the upper Mississippi and Missouri valleys, and upper lake region on Friday or Saturday (21st and 22d).

(Signed) DUNWOODY,
Assistant."

Although the development of the low area in the lake region retarded the movement of this cold wave, it may be seen from the accompanying chart (v.) that frosts occurred over the greater part of the sections named in the telegram announcing that frosts would occur. The full line on this chart encloses the region within which numerous frosts occurred as stated in the warning. Professor Nipher, of the "Missouri Weather Service," states that the frosts were severe in some sections of his state, on the date named, and reports from Arkansas and Wisconsin show that frosts occurred within fifty miles of Memphis, Tennessee, and Chicago, Illinois. The cold wave was not dissipated, but only retarded in its advance eastward, as the reports from the states of the Ohio valley show that damaging frosts occurred in these sections on the 25th and 26th.

VI.—This area was central north of Montana on the 24th, and was apparently a part of high area v. It advanced after the low area, previously referred to, had filled up, moving to the southeast over the Missouri valley on the 25th and 26th, causing killing frosts in Michigan, Iowa, Wisconsin, and northern Illinois, and light frosts in the states of the Ohio valley, Missouri, Kansas, Nebraska, and Colorado. Clear, cool weather prevailed on the 26th, when the centre of greatest pressure was near Cairo, Illinois. During the 27th and 28th this area extended eastward over the Atlantic states, and it finally disappeared off the South Atlantic coast on the 28th.

AREAS OF LOW BAROMETER.

Nine areas of low barometer have been observed within the limits of the United States, or near its boundaries, during the month of September. The mean latitude of the tracks of these areas is slightly to the north of the region of average storm frequency of the month. One depression developed and disappeared within the limits of the stations after moving to the west and south near the centre of the continent; and the only tropical storm observed during the month has been clearly traced from the West Indies to the south Atlantic coast, where, judging from the number of reports at hand, it lost its energy when the centre was near the most westerly part of its course. Chart i. exhibits the tracks of the centres of the low areas traced during the month. In the case of low-area iv., the centre of disturbance has been given at the 7 a. m. observation, and these locations have been determined only approximately, owing to the small number of reports received.

The following table shows the latitudes and longitudes in which each depression was first and last observed, and the average hourly velocity of each depression within the limits of the stations of observation:

Areas of low barometer.	First observed.		Last observed.		Average velocity in miles per hour.
	Lat. N.	Long. W.	Lat. N.	Long. W.	
	° ′	° ′	° ′	° ′	
No. I.	51 00	90 00	49 00	58 00	17.5
II.	54 00	103 00	50 00	60 00	35.0
III.	47 00	102 00	50 00	68 00	25.0
IV.	.....	.....	34 30	77 00	9.2
V.	52 00	103 00	51 00	94 00	17.0
VI.	53 00	100 00	50 00	63 00	35.0
VII.	40 00	86 00	37 00	93 00	27.0
VIIa.	54 00	100 00	51 00	88 00	23.0
VIII.	42 30	91 00	50 00	56 00	20.5
IX.	38 00	104 00	38 00	73 00	34.5

I.—The track of the centre of this depression is only approximately given, as only the southern part of the disturbance was felt by the most northerly stations. At midnight of the 1st a slight disturbance extended over the upper lake region, attended by light rains, the barometer being high east of New England and in the upper Missouri valley. The wind shifted to northerly in the upper lake region and northwest, with local rains on the morning of the 2d, while the barometric changes indicated that the low area was moving eastward toward the lower Saint Lawrence valley. This storm became more extended to the southward as it approached the coast, the rain area including the middle states, New England, and all stations in the northeast. On the morning of the 3d strong southwest to northwest winds occurred off the Atlantic coast north of Hatteras, North Carolina, and the Maritime Provinces, where the barometer had fallen to 29.5 near the centre of disturbance. On the afternoon of the 3d the centre of this storm was north of Sidney, Nova Scotia, where the wind was from the southwest; force, twenty-four miles per hour; at 3 p. m. the barometer read 29.56. This storm increased in energy as it advanced to the eastward, and when last observed the barometer at the centre had not reached its minimum.

II.—This depression was central north of Manitoba on the morning of the 3d. As in the preceding storm the track of the centre of disturbance was to the north of the stations of observation, and the easterly movement can only be traced by the changes occurring in the southern limit of the storm. It passed eastward north of the lake region during the 3d and 4th, attended by local rains in the northern states, and it was probably central north of Farther Point at midnight of the 4th. The pressure increased in the Saint Lawrence valley on the 5th, when the brisk and high northwest winds indicated that the storm had passed rapidly to the east over the north Atlantic.

III.—This disturbance developed in the upper Missouri valley on the night of the 5th, the centre being near Bismarck, Dakota, at the 7 a. m. report of the 6th, when the barometer indicated a pressure of 29.8. During the 6th it moved slightly south of east to southern Minnesota, becoming clearly defined and inclosed by circular-formed isobars of 29.8 and 29.9, while the pressure was above 30.2 north of Minnesota. By the morning of the 7th the centre was located in southern Wisconsin, and on the afternoon of the same date the disturbance reached the most southern point of its course in southern Michigan, while the general form of the depression had changed to that of an ellipse, extending from Missouri to Lake Ontario. Strong northerly winds occurred in the upper lake region after the centre passed to the east of that region, and the energy of the storm increased very much during the 7th, without any marked change in the barometer at the centre of disturbance. The gradient increased, however, in the western portion of the storm, owing to the advancing high area from the northwest. At midnight of the 7th the course changed to the northeast, and during the 8th this storm passed along the Saint Lawrence valley, the centre following the general line of that river. The pressure continued near 29.8 at the centre during the entire course of the storm from the northwest until it disappeared northeast of the Maritime stations.

IV.—The first indications of this hurricane were observed at Saint Pierre, Martinique, on the afternoon of the 4th. The following report thereof was furnished by Captain Alexander, of the brig "L. & W. Armstrong": "Tuesday, September 4th. Harbor of Saint Pierre, Island of Martinique.—Forenoon, fine weather, barometer (aneroid) 30.06. Afternoon, intermittent showers, wind ene., force 3. At 5 h. 0 m., a heavy swell began to come from wnw., and broke very heavily on the beach; glass 30.04, wind ne. At 6 h. 30 m., wind n., heavy rain squalls, glass 30.04, sea increasing; 7 h. 15 m., wind nnw., force 7, glass 29.8; at times very heavy rain; 7 h. 45 m., wind nw., force 9, glass 29.7; 8 h. 30 m., wind w., force 9, glass 29.54; incessant rain, sea breaking very heavily. At 9 h. 30 m., wind from w. to wsw., blowing in furious gusts; the glass fluctuated so much that at first I thought it was broken, but I noticed that it fell to 28.2 and rose again to 29.02. At that time we had to close the cabin doors, as the decks were flooded with water; at about 10 h. 30 m., the wind blew steadily from wsw., with hurricane force. All hands were lashed to the vessel to prevent being washed overboard; the sea was furious and very broken. At this time I saw the first of the vessels go ashore, and in a few minutes they broke up. I had no chance to go below to look at the glass until 14 h. 15 m., when it read 29.5; about half an hour before this, the wind hauled to sw., with the first flash of lightning that I observed. At 16 h. 0 m., the wind would lull at times and the rain would cease, then again it would blow in furious gusts accompanied by heavy rain. At 16 h. 30 m., the wind hauled to s., with very bright flashes of lightning; sea going down, glass 30.0, wind s., force 10, sea rough but not breaking. At 22 h. 0 m., glass 30.06, wind force 3, clearing."

The above report shows that the hurricane passed from se. to wnw. of Martinique and, by the morning of the 5th, it had entered the Caribbean sea. At Basse Terre, Guadeloupe, all the wharves were destroyed.

The following report, furnished by Captain G. S. Locke, of the s. s. "Muriel," at Saint Thomas, indicates that the centre passed at some distance south of that island: "5th.—This day began with a fresh breeze from ene. and with a very threatening appearance; a hurricane reported to windward. At 4 p. m. the wind hauled to ese., with heavy squalls and much rain. The barometer gave no indication of bad weather, particularly

of the close proximity of a hurricane, as it fell only about .15 inch during the twenty-four hours. The hurricane must have passed about two degrees south of this island. During the night the sea-swell was very heavy from the southwestward; at 11 p. m. the weather cleared up; barometer rising."

During the 5th the hurricane moved slowly westward, south of Porto Rico, as indicated by the report of Captain C. V. Decker, of the brig "Rising Sun:" "At San Juan de Porto Rico the barometer was slightly affected by the cyclone passing to the southward of the island on September 5th. While the storm was advancing toward the island the weather was threatening, the sky being covered with heavy black clouds, the wind blowing a moderate gale from northeast to southeast. At 11 h. 23 m., Greenwich mean civil time, the weather partially cleared."

By midnight of the 5th the storm-vortex was near to Saint Domingo. At midnight of that date the wind blew from ne., and at 7 a. m. of the 6th it suddenly veered to sw., blowing with great fury and lasting until 10 a. m. Much damage was done at sea and on shore; vessels at anchor were driven from their anchorages and blown out to sea; the s. s. "Foscolia," off Saint Domingo, sustained severe damages, and a large number of small craft were lost; in nearly all cases all hands perished. The hurricane is reported to have given no warning of its approach, except that the sea rose before the wind.

The report of Captain Cameron, of the Royal Mail Steam Packet Company's s. s. "Belize," is given herewith, and shows that the vessel crossed the track of the hurricane between Cape Maysi, Cuba, and Castle Island Light (Crooked Island,) on the 6th, and that the storm-centre was, for several days, to the westward of the ship:

"September 5th.—11 hours, Greenwich mean time, left Port Antonio, Jamaica, barometer (corrected) 29.87; 17 hours, moderate ne. wind, with passing clouds moving toward the sw., barometer 29.85; 21 hours, fresh ne. wind with ne. sea, barometer 29.8.

"6th.—5 hours, fresh ne. wind and cloudy, with high sea, barometer 29.8; 9 hours, moderate ne. wind and squally, with rain, barometer 29.7; 13 hours, passed Cape Maysi light, barometer 29.64; 17 hours, strong n. gale, with furious squalls and heavy rain, very heavy cross sea, barometer 29.39; 21 hours, strong sse. gale, with rain at times and a high, confused sea, barometer 29.41.

"7th.—5 hours, fresh se. gale, with constant heavy rain and high se. sea, barometer 29.58; 7½ hours, passed Castle island light-house; 9 hours, strong se. wind, heavy sea, and constant rain, barometer 29.61; 12 hours, passed Bird Rock light; 17 hours, strong se. gale, with furious squalls and vivid lightning, barometer 29.62; 21 hours, strong se. gale, with furious squalls, thunder, much vivid lightning, and heavy rain, barometer 29.62, ship laboring heavily.

"8th.—5 hours, fresh se. gale, with very heavy se. sea, cloudy; 9 hours, strong se. wind, cloudy, and high sea, barometer 29.68; 17 hours, strong se. wind, cloudy, heavy sea, barometer 29.72; 21 hours, strong se. wind, cloudy, heavy sea, barometer 29.72.

"9th.—5 hours, sudden shift of wind to ssw., with rain and high sea, barometer 29.74; 7 hours, wind shifted to se.; 9 hours, strong se. wind, squally, with heavy rain, barometer 29.76; 17 hours, no change, barometer 29.74; 21 hours, fresh se. wind, with furious squalls and heavy sea, barometer 29.72.

"10th.—5 hours, strong se. wind, overcast, barometer 29.7; 9 hours, strong se. gale, with heavy rain and very heavy sea, barometer 29.66; 17 hours (about N. 33°, W. 74°), very heavy se. gale, with terrific squalls of heavy rain and very heavy cross sea (se. and sw.), barometer 29.6; 21 hours, very heavy sse. gale, with hard squalls and heavy cross sea, barometer 29.61.

"11th.—5 hours, wind and sea decreasing, overcast, barometer 29.66; 9 hours, fresh se. wind, fine weather, high sea, barometer 29.7; 17 hours, moderate se. wind, high sea, barometer 29.76; 21 hours, moderate e. wind and fine weather, barometer 29.77."

During the 7th the hurricane passed slowly north-northwestward along the western shores of the Bahama islands, causing numerous shipwrecks and great loss of life along the Exuma cays. At Great Harbor cay, 50 miles southeast of Nassau, the wind blew with hurricane force from ene., veering with the sun to sw.; all fruit trees were uprooted and much damage was done. By the morning of the 8th the hurricane was central south of Nassau, New Providence, Bahamas.

The following report is taken from the "Nassau Guardian," of September 8th, and was forwarded to this office by Captain Faircloth, of the s. s. "Cienfuegos:" "* * * The weather was squally during the whole of yesterday (7th), and the sun, at setting, shed a lurid glare over the western sky. There were occasional showers during the evening and a breeze sprang up from ene., increasing till midnight, when a gradual fall in the barometer commenced. * * * At 11.30 a. m. (8th) the wind gradually shifted from ne. to nw., and the cyclone was at its height at 2 p. m., the barometer indicating 28.868. It then began to rise, and the wind veered to wsw. at 6.30 p. m., blowing from that point for four and a half hours. Rain fell heavily nearly all day and caused great destruction of property by beating into the houses and stores; there is scarcely a house which has not sustained damage. Walls, fences, and trees have been blown down in all directions, and many of the houses of the poor completely prostrated. Many wharves are totally destroyed and others are greatly damaged; the destruction to shipping far exceeds that caused by the hurricane of 1866. * *"

The following observations were recorded on board the light-house tender "Richmond," anchored near Nassau:

Date.	Hour.	Wind.	Force.	Barometer.
September 8th	1.00 p. m.	n.	12	29.980
Do	1.20 p. m.	n.	hurricane	28.940
Do	1.30 p. m.	n.	"	28.930
Do	1.45 p. m.	nnw.	"	28.898
Do	2.00 p. m.	nw.	*furious gusts*	28.868
Do	2.20 p. m.	nw.	"	28.908
Do	2.30 p. m.	wnw.	"	28.914
Do	3.00 p. m.	wnw.	"	28.926
Do	3.30 p. m.	wnw.	"	29.034
Do	3.45 p. m.	w.	"	29.104
Do	4.00 p. m.	w.	"	29.130
Do	4.30 p. m.	w.	"	29.258
Do	4.40 p. m.	w. by s.	"	29.300

N. B.—It is not known whether the above barometric values are as read off, or whether the necessary corrections have been applied.—C. S. O.

The "Nassau Guardian," of the 15th, publishes a list of nearly one hundred vessels that have been either totally wrecked or seriously damaged in this hurricane; the same paper also states that the number of lives lost has been very great, fifty-three having been reported up to that date.

During the 8th the storm-vortex appears to have passed between Nassau and Eleuthera island, and by the morning of the 9th it was probably central north of, and near, Abaco island. Mr. J. Peterson, of the brig "Giles Loring," reports as follows: "On the 9th, between Abaco and Stirrup cays, had a gale from e.; ran in on the Bahama banks for anchorage; anchored in four and a half fathoms; barometer, 29.5, blowing a hurricane; cut away spars to save vessel and cargo. At 11 a. m. the wind suddenly shifted round to nw. in a furious blast, covering the vessel fore and aft with spray. Latter part of the day, fresh gale and clearing weather, wind w."

Mr. Peterson also reported having been informed by wreckers that at the Beminis (west of Nassau), the wind blew from n. to nw. a moderate gale. Although much damage was done to property among the islands north of New Providence, it is reported, however, that the hurricane was not so disastrous as when south of that island.

During the 9th the hurricane appears to have moved nearly due northward; the following reports serve to indicate its course and show that it exhibited great energy after leaving the Bahamas:

Captain Klocking, of the German bark "Wieland," forwards the following from Charleston, South Carolina: "After sailing through the trade winds with light ne. and ene. breezes,

weather very hot until the 7th, we fell in with an e. by s. breeze, force 5 (N. 27° 35′, W. 69° 58′), barometer 29.9 (error unknown), se. sea swell. 8th, N. 28° 29′, W. 72° 53′, wind se. 6, squally, barometer 29.85, s. sea swell, lightning in the western horizon. 9th, N. 29° 34′, W. 75° 54′, wind ese. 7, thunder squalls with rain, barometer 29.75, s. sea swell, high. 10th, N. 30° 18′, W. 76° 18′, wind se. blowing a violent gale, barometer 29.55, lightning all around the horizon, rain squalls, sea from all directions. 11th, N. 31° 31′, W. 74° 38′, wind s. 8, barometer 29.70, sse. sea swell. 12th, N. 32° 5′, W. 76° 18′, wind sw. by s. barometer 29.75, weather fine, all canvas set. (Observations taken at 0 hr. 8 min. Greenwich mean time.)"

Captain J. W. Reynolds, of the s. s. "City of Washington," reports as follows: "Sunday, September 9th, 4 a. m., barometer 29.8, the wind came out strong from se. with heavy rain and cross sea; at 9 a. m., hove ship to (N. 29° 30′, W. 78° 5′), blowing hard from ese., barometer 29.7, raining hard. At 8 p. m., blowing a hurricane with an ugly cross sea breaking over the ship, barometer 29.3, wind e. heavy rain. Monday, September 10th, 4 a. m., blowing a hurricane, a very heavy cross sea running and breaking over the ship, wind ne., raining heavily, barometer 29.0; 8 a. m., (near N. 30° 45′, W. 78° 52′) blowing hard from ne., barometer 29.05; noon, wind n. barometer 29.4; 4 p. m., wind nw., blowing freshly, barometer 29.6, kept ship on her course."

Captain Quick, of the s. s. "New York," reported: "September 8th (N. 31° 45′, W. 80° 00′), from noon of this day until midnight, weather squally, wind light from e. to ne., barometer falling. 9th came in squally; when Cape Canaveral bore west, at 3.30 a. m., a very heavy swell came in from ese. to ne., weather very threatening, thunder and lightning. The barometer had fallen very slowly to 29.7, and remained at 29.7 until I was within thirty miles of Jupiter inlet, when the wind hauled from ne. by way of n. to w. At noon of this day, at Jupiter inlet, the barometer began to rise, with clearing weather, but still squally from the west."

Captain A. C. Burrows of the s. s. "Rio Grande," bound from New York to Galveston, furnishes the following interesting observations concerning this hurricane: "For several hundred miles outside of its approaching periphery, the sunsets were yellow and the reflection on the clouds in the east was fiery red, while the rising of the sun was characterized by a startling redness of the eastern sky (always considered a sign of bad weather). The sun's early rays were scalding and stifling, although the thermometer did not indicate unusual heat; the atmosphere during the nights was close and oppressive and the stars presented a 'sprawling' and 'spattered' appearance, while the young moon was seen surrounded by a vapory halo of continually changing density. The action of the barometer showed that the cyclone was pushing its irresistible progress north against a district of high barometer, for the reason that, from the time the "Rio Grande" left New York (10 p. m., 5th,) until the storm-centre bore nearly east of her, seventy-six hours later, the barometer was gradually forced down in the following manner: it would fall a tenth and then rise (probably on account of local influence) half as much, then fall more, and so repeat. At 5 a. m., of the 9th, the ship's position was sse. of Canaveral, fifty-five miles from it and about ten miles from the shore; here the barometer began to fall very rapidly from 29.80, the wind breezing up from nne., accompanied by heavy rains and an increasing swell from about east. At 6 a. m. the "Rio Grande" was hauled off shore, as it was considered safer to get away from the immediate vicinity of the coast, particularly as it was impossible, at that time, to tell in just what direction the storm was advancing. Care was taken, however, not to go farther than was necessary to secure an offing, as the probabilities were that any progress to eastward would bring the ship nearer to the vortex of the storm. Fortunately this passed so far to the east of us that the wind only reached the force of a heavy gale, and the storm advanced northward so fast that that force only lasted till about 8 p. m., when the breaking clouds and moderating wind showed that the storm had passed by, and we were able to resume our course without having suffered any loss beyond that of sixteen hours' time."

During the 10th the hurricane continued its northerly movement toward the southern coast of North Carolina, and by the morning of the 11th the centre was near Smithville, North Carolina. The following observations were taken at that station during the hurricane:

Observations taken at Smithville, N. C., during the most violent portion of the storm of September 10, 11, and 12, 1883.

Date.	Time.	Barometer corrected for temperature, instrumental error, and elevation.	Exposed thermometer.	Wind.	
				Direction.	Velocity in miles per hour.
1883			°		
September 10	7.00 a. m.	30.031	60.0	ne.	20
Do	3.00 p. m.	29.829	64.0	ne.	28
Do	11.00 p. m.	29.586	65.5	ne.	32
September 11	6.10 a. m.	29.170	71.0	e.	56
Do	6.35 a. m.	29.170	71.0	e.	80
Do	7.00 a. m.	29.184	71.0	e.	58
Do	7.30 a. m.	29.157	71.0	e.	84
Do	8.00 a. m.	29.175	70.8	se.	84
Do	8.20 a. m.			se.	93
Do	9.00 a. m.	29.191	70.5	se.	86
Do	9.15 a. m.	29.217	70.5	se.	70
Do	9.30 a. m.	29.247	70.0	se.	82
Do	10.00 a. m.	29.284	69.0	se.	79
Do	10.30 a. m.	29.309	69.4	s.	77
Do	11.00 a. m.	29.355	68.7	s.	72
Do	3.00 p. m.	29.503	68.0	sw.	50
Do	11.00 p. m.	29.725	66.0	sw.	25

The gale began at 9.30 a. m. of the 10th; it reached its maximum force at 8.20 a. m. of the 11th, and ended at 1.20 a. m. of the 12th.

During its progress from the Bahamas, the centre does not appear to have deviated from a northerly course, since its extreme violence was not felt at stations on the coast of Florida, Georgia, and South Carolina, nor by vessels east of the seventy-fourth meridian, as indicated by following reports, but it was very disastrous to vessels between Hatteras and Wilmington, North Carolina:

Captain J. W. Lindsley, of the brig "Alcira," reports: "On the 9th, 10th, and 11th (between N. 35° 01′, W. 74° 10′, and N. 36° 32′, W. 73° 30′), the wind blew heavy in squalls from all points of the compass, with a destructive sea running from all quarters. The barometer fluctuated rapidly, but did not at any time fall below 30.06; the clouds were very low, but I had no means of testing their velocity or that of the wind. I regret very much that, owing to loss of sails, &c., and the lack of proper instruments, I was not able to make any close observations, as there were some peculiarities attending this storm that I would have liked to note more particularly, but I hope that others have been able to do so."

Captain A. B. Chase, of the schooner "Norena," reported: "From the 8th to the 13th (from N. 31° to N. 39° and between W. 67° and W. 68°), experienced a very heavy swell, commencing at ssw., and running gradually around to w. The weather during this time was fine, but a heavy bank of clouds appeared in the western board, with mare's tails flying rapidly from sw., along the horizon to an elevation of 15° to 30°. The barometer, though high, oscillated more or less."

In Captain Chase's report, the barometer ranged from 30.1 to 30.3, wind ese. to se., s. and ssw., force 3 to 4, weather very fine.

The observer at Jacksonville, Florida, reported on the 9th brisk ne. wind blowing in squalls, heavy rain at intervals; barometer fell slowly until 3 p. m., (29.88) after which it rose slightly. On the 10th the barometer remained stationary and the ne. wind backed to nw. and moderated to a light breeze. The maximum velocity of the wind at this station was 22 miles n. At display stations on the coast of Florida the velocities

were as follows: Saint Augustine, ne., 40; Fort George island, n., 30, and at Fernandina the display was reported justified.

At Savannah, Georgia, on the 9th, the wind reached a velocity of 26 miles an hour from the northeast, the barometer remaining steady at 29.99; on the 10th the wind backed from n. to nw. and reached a velocity of thirty miles an hour; the lowest reported barometer was 29.82, on the afternoon of the 11th. At Charleston, South Carolina, high winds continued throughout the 10th, the barometer falling gradually, with rain during the afternoon; on the 11th the wind changed to w. and nw., brisk; barometer rising; the maximum velocity was 31 miles, n.; lowest barometer, 29.66.

The heaviest gales were experienced at stations north of the centre. On the 10th the wind reached a velocity of 60 miles ne., at Fort Macon, North Carolina, with heavy rain at intervals during the day. On the early morning of the 11th the wind shifted to se. and continued to blow with great force; at 7 a. m. the barometer read 29.70, and fell slowly until 4 p. m. of that date, after which a slight rise occurred and the wind afterwards shifted to sw., the gale ending on the 12th.

At Cape Lookout, North Carolina, the gale began on the morning of the 9th, the wind blowing from ne., gradually increasing in force and accompanied by heavy rain at intervals. By the morning of the 10th the wind had attained a velocity of about sixty miles an hour; low nimbus clouds moved from ne., and a very high ene. swell broke on the beach. From 12 m. till 8.30 p. m. the wind blew with an estimated velocity of 75 miles an hour; it then began to lull, and at intervals it rose in sudden gusts of terrific velocity, accompanied by sheets of salt water and sand and very heavy rain, which continued during the night. The wind remained at ne. until 1 a. m. of the 11th, when it shifted to se. and blew with great force throughout the day, accompanied by heavy rain. The rain was reported to have been the heaviest known at this station in many years. During the night of the 11–12th, the wind shifted to sw. and moderated. No damage was done at this place, as, owing to the timely warning issued from this office, all fishing property had been moved to places of safety.

At Portsmouth, North Carolina, the gale was equally severe; the wind reached a velocity of 62 miles, ne. on the 10th, shifting to se. and e. gales on the 11th; the high tide and heavy surf submerged the island to a depth of one foot. One vessel was driven ashore at Ocracoke inlet. The observers at coast stations reported much wreckage drifting along the shores. At Hatteras the lowest reported barometer during the gale was 29.73.

At Wilmington, North Carolina, the ne. gale began at 3 p. m. of the 10th, reaching a velocity of 32 miles an hour, barometer falling. On the 11th the barometer read 29.41 and the wind changed to se. and attained a velocity of 39 miles an hour. Telegraph and telephone wires were prostrated and one or two buildings of light construction were blown down; on the river several vessels were driven from their moorings, but received only slight damage. The land on the western side of the river was flooded by the immense body of water which was driven up the river by the gale.

The hurricane was most severe at Smithville, North Carolina, and appears to have lost its energy on reaching the land. The shifting of the wind indicates that the centre passed to the westward of the station, but the barometric gradient decreased so rapidly that the subsequent path of the disturbance became doubtful and cannot be traced. The observer at Smithville reports that many fences and buildings of light construction were destroyed, several houses unroofed, and trees uprooted. The leaves remaining on the trees after the gale, had the appearance of having been frostbitten, turning black and beginning to wither. The rain had a saltish taste from admixture of spray carried up and borne along by the violence of the wind. Many vessels broke from their moorings and drove ashore, sustaining more or less damage. The damage by the hurricane at Smithville was estimated at from $8,000 to $10,000.

After the 10th, 11th, and 12th the winds remained high over the ocean from W. 75° eastward to the sixtieth meridian, but the pressure increased to 30.0 and above.

Captain Powell, of the bark "Aquidneck," in a report of heavy ne. to se. gales encountered by him during the 9th, 10th, and 11th, when off Hatteras, says: "My barometer never fell below 30.0, nor rose above 30.2, the average was 30.1; for such a gale as this I never saw the barometer so high."

After this storm reached Wilmington, North Carolina, a slight depression developed in the southern portion of the middle Atlantic states on the 11th, and moved northward to western New York. This movement was traced by the wind directions at neighboring stations, the difference of barometric pressure being much less than one-tenth of an inch.

The following warnings in connection with this hurricane were issued by the Chief Signal Officer: At midnight of September 6th coast stations from Delaware Breakwater to Pensacola were warned of the approach of a cyclone, and vessels advised not to sail until further notice:

"Special bulletin, September 7th, 1 a. m.—A hurricane is reported in the West Indies near Porto Rico, moving slowly to the northward."

"Special bulletin, September 7th, 10 a. m.—Reports from the West Indies indicate that a hurricane is moving towards Florida from southeast of Jamaica, and vessels should not sail southward until the track of this storm is more fully determined."

September 7th.—Despatch sent to the "Maritime Exchange," New York: "Hurricane reported from the West Indies near Jamaica. Direction of movement cannot now be determined. Further information will be sent you when received."

"Special bulletin, September 8th, 10 a. m.—Reports from Florida indicate that a severe storm is moving slowly northwestward from the West Indies."

"September 8th.—To observer, New York: Reports from Florida indicate that a hurricane is moving northwestward from the West Indies."

"Special bulletin, September 10th, 1 a. m.—A severe storm is apparently moving northeastward from the West Indies, and it is now central off the south Atlantic coast."

"Special bulletin, September 10th, 10 a. m.—The indications are that the severe storm, which is central off the coast of Florida, will move northeastward during Monday and Tuesday, causing dangerous gales off the southern Atlantic, middle Atlantic, and southern New England coasts. Shipmasters are warned that it is not safe for vessels to leave port."

"Special bulletin, September 11th, 1 a. m.—The hurricane previously reported in the West Indies is moving northward along the Atlantic coast and is now central near Cape Hatteras. Dangerous gales are anticipated off the middle Atlantic and New England coasts on Tuesday and Wednesday. Vessels should not leave port."

"Special bulletin, September 11th, 10 a. m.—The West Indian hurricane has moved northward and is now clearly defined as central on the south Atlantic coast near Wilmington, North Carolina. Violent gales are reported this morning from the middle Atlantic and south Atlantic coasts, with heavy rains on the coast. Dangerous gales are indicated for the New England and middle Atlantic coasts during Tuesday and Wednesday. Vessels should not leave port, as the storm will be unusually severe north of Hatteras, North Carolina."

V.—This was a disturbance of considerable energy central northwest of Manitoba on the 12th, where the barometer fell below 29.5, attended by brisk and high winds. It apparently moved southeastward during the 12th, and finally disappeared to the north of Lake Superior on the 13th, without causing any marked change in the atmospheric conditions within the United States.

VI.—On the morning of the 15th the barometer was low north of Minnesota, and the succeeding report of that date indicated the presence of a low area north of the upper lake region. On the 16th this storm approached the lower lake region from the northwest, causing general rains as far to the

southward as the Gulf states. The advance of the high area to the west caused the depression to become greatly extended to the southwest over the Ohio valley and the sudden fall of temperature, due to the northwest winds, was attended by heavy rains in the Ohio valley and lake region. As in the preceding area described, this storm passed to the northeast and disappeared after apparently losing the greater portion of its energy.

VII.—On the morning of the 20th an area of high barometer was central in the upper Saint Lawrence valley, and a second high area was approaching from the extreme northwest, while the barometer was relatively low in the Mississippi valley. The high area to the east of this depression disappeared during the afternoon, but by midnight of that date the pressure had increased from two to four-tenths of an inch at stations on the eastern Rocky mountain slope as far south as Texas, the barometer remaining high and above 30.6 in the upper Missouri valley. The extended trough of low barometer was succeeded by a well-defined low-area, central near Milwaukee, Wisconsin, at 11 p. m., of the 20th, attended by rain in the upper lake region, and generally fair weather and cold northwest winds at the stations west of the Mississippi river. During the 21st this storm-centre moved first to the northwest toward Saint Paul, Minnesota, where it was central at 7 a. m., and afterwards to the southward over Iowa and Missouri, causing rain in the northwest and north of the Ohio valley, followed by gradually clearing weather in these sections on the 22d. The westerly and southerly movements of the depression delayed the advance of the cold wave in the northwest, and the frost warnings issued from this office were only verified at stations west of the Mississippi and in Wisconsin on the dates designated in the warning, but the frosts which occurred two days later in the states north of the Ohio river were caused by the cold wave which followed the disappearance of area number vii. Chart v. of this REVIEW shows the limits within which frosts were reported on the dates for which they were predicted. Reports show that these warnings were verified over the greater portion of the section named, and that frosts actually occurred within a few miles of Chicago, Illinois, and thence southward to Memphis, Tennessee.

VII *a*.—During the 19th, while number vii. was developing in the upper lake region, a second low area appeared north of Manitoba. This disturbance apparently moved southeastward until the afternoon report of the 20th, after which it probably formed a part of the low area previously described as vii.

VIII.—This area was central in Iowa on the 23d, being well-defined at the morning report of that date, and attended by local rains in the northwest and lake region. It moved directly eastward during the 23d, causing general rains in all districts, increasing in energy as it passed over the lake region. The barometer fell at stations near the centre, and by midnight of the 24th the centre of the disturbance was north of Lake Ontario, where the pressure was 29.06. This storm became unusually violent as it passed northeastward over the Saint Lawrence valley, and dangerous gales and heavy rains occurred at the Canadian stations, in the lower lake region, and off the New England coast. On the morning of the 25th the centre was near Farther Point, where the barometer had fallen to 28.8. The afternoon report of the same date showed that the centre of disturbance had passed to the east of Farther Point, but the barometer had fallen to 28.71 at this station, with a wind velocity of forty-seven miles per hour from the west. This storm disappeared to the east of the maritime stations on the 26th.

IX.—Low area ix. approached from Colorado on the 28th, where it was central at midnight of that date as a slight disturbance. It moved directly eastward during the 29th and 30th over the Ohio valley, causing but a slight disturbance at the central stations. It was at no time well defined as a low area but as an extended trough of low pressure moving slowly eastward, attended by variable winds and light rains. Cold northerly winds prevailed at the northern stations at the close of the month, and the reports received at 11 p. m. of the 30th indicate that this depression passed off the middle Atlantic coast with increasing energy.

NORTH ATLANTIC STORMS DURING SEPTEMBER, 1883.

[*Pressure expressed in inches and in millimetres; wind-force by scale of* 0—10.]

Chart ii. exhibits the tracks of the principal depressions that have moved over the north Atlantic ocean during September, 1883. The location of the various storm-centres has been approximately determined from reports of observations furnished by agents and captains of ocean steamships and sailing vessels in the north Atlantic, and from other miscellaneous data received at this office up to October 21st. The observations used are, in general, simultaneous, being taken each day at 7 h. 0 m. a. m., Washington, or 0 h. 8 m. p. m., Greenwich mean time.

Five depressions are charted for the month of September, 1883. Of these, two are traced from the coast of the North American continent eastward to Europe; and one is a continuation of a disturbance traced from the United States to mid-ocean at the close of August. The remaining depressions, numbers ii. and v., either dissipated or moved northward beyond the limits of observation. It is more probable, however, that they took the latter course, since scattering vessel-reports at hand indicate the presence of depressions north of the fifty-fifth parallel, passing far to the north of the British Isles. The depressions numbered iii. and iv. appear to have moved somewhat south of the usual track. The violent West India hurricane which prevailed during first decade of the month is traced on chart i., and is fully described in this REVIEW as number iv., under the heading "Areas of low barometer." The following descriptions refer to the depressions traced on chart ii.:

I.—This was a continuation of the tropical hurricane described as number viii. in the REVIEW for August. It moved over the Banks of Newfoundland as a storm of great energy, and at the close of August it was central near N. 52°, W. 35°. Moving eastward, or slightly south of east, with undiminished energy during that day, it reached N. 50°, W. 15°, on the 1st. The following report, furnished by Captain Bussins, of the s. s. "Neckar," is given as indicating the approximate vicinity of the storm-centre and its violence:

Date.	Time.	Position. Lat. N.	Position. Long. W.	Barometer (corrected). Inches.	Barometer (corrected). Mill.	Wind. Direction.	Wind. Force.	Remarks.
		° ′	° ′					
Aug. 31	noon	Off	Lizard	29.75	755.6	ne.	2–3	Almost calm at times.
Do	4 p. m			29.75	755.6	sw.	2	Smooth sea.
Do	8 p. m	49 44	8 00	29.74	755.4	wsw.	2	Light westerly swell.
Do	12 p. m	49 54	9 16	29.70	754.4	w.	3	Wind backing.
Do	16 p. m	50 04	10 32	29.42	747.3	s.	5	Do.
Do	20 p. m	50 23	11 20	29.81	731.8	sc.	9	Rain; heavy showers.
Sept. 1	noon	50 30	12 35	28.43	722.1	ese.	7–6	Rain and confused sea.
Do	1 p. m			28.30	720.3			Lowest reading.
Do	4 p. m	50 30	13 44	28.52	724.4	nne.	8	Rain and confused sea.
Do	8 p. m	50 30	14 13	28.67	728.2	n.	9	Increasing wind and sea. At 6.30 p. m. wind nnw., was blowing a hurricane; ship hove to.
Do	8 p. m	50 29	14 22	28.84	732.5	nnw.		Wind blowing a hurricane; ship hove to.
Do	12 p. m	50 28	14 41	28.98	732.1	nnw.	10	Slightly clearing.
Do	16 p. m	50 27	15 05	29.27	743.4	nnw.	9	Do.
Do	20 p. m	50 27	15 30	29.46	748.3	nnw.	9	Sky breaking.
Sept. 2	noon	50 28	16 10	29.60	751.8	nnw.	8	Sea decreasing; weather moderately fine and the sky cleared.

Captain Heeley, of the s. s. "England," reports as follows: "September 1st, 3 a. m., Greenwich mean time, barometer 28.4 (721.3), light variable winds veering between ese. and nne., with very heavy sw. sea. 5 a. m., barometer 28.37 (720.6), very threatening appearance to the northeastward. 5.30 a. m., gale struck us from nne., rapidly increasing to hurricane force, with very heavy confused sea and heavy rain; ship enveloped in spray and impossible to see a ship's length. Kept ship away to the southward; the barometer began to rise rapidly. 7 a.